Status, ecology, and vocalizations of the Five-coloured Barbet *Capito quinticolor* in Ecuador, with notes on the Orange-fronted Barbet *C. squamatus*

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Received 20 November 1997

The Five-coloured Barbet *Capito quinticolor* is a little-studied endemic of the Pacific lowlands of Colombia, where it is known from only a few localities in Chocó, Valle, Cauca, and Nariño (Hilty & Brown 1986, Salaman & Gandy 1994). It was classified as Vulnerable by Collar *et al.* (1994), because of its restricted range and its apparent reliance on closed-canopy wet forest. Recently its habitat has come under severe pressure from man.

In July 1990, Robbins obtained the first records for Ecuador during avifaunal surveys by the Academy of Natural Sciences, Philadelphia (ANSP), and the Museo Ecuatoriano de Ciencias Naturales, Quito (MECN), *c.* 20 km NNW of Alto Tambo (00°57′N, 78°33′W; 350 m), Esmeraldas. Jahn extended the distribution 40 km southwestward, when birds were observed on 5 June 1997 near Playa de Oro commune (00°52′N, 78°47′W; 90 m), Esmeraldas. The species was also encountered by Jahn on 16 September 1997 during a census of foothill forest near Playa de Oro at 350 m, and in July 1998 at *c.* 150 m near Tsejpi commune, Río Zapallo (00°47′N, 78°50′W), Esmeraldas. The latter site is located about 60 km south of the Colombian border and represents the southernmost record for *C. quinticolor*.

In July 1990 the site northwest of Alto Tambo was located at the end of the road as it was being built, and therefore the forest was mostly pristine with secondary forest restricted primarily to the immediate vicinity of the road. Robbins observed and heard this species most days, with as many as six individuals per day, in the canopy of both secondary and primary forest. Birds were seen foraging at melastomes in secondary forest and in treefall areas of pristine forest. Gonad and moult data from five specimens (ANSP 182368-70; MECN 1492; University of Kansas 86748) collected on 17 July indicate that the species was not breeding at that time. All three males had testes 2x1 mm and all five specimens had heavy body moult and light fat. Mass: males, 60.5–64 g; females, 55 and 62 g. Soft part colours for all: iris brown; bill black with greyish base; tarsus grey.

In the Playa de Oro area *C. quinticolor* was uncommon but widespread, with most records from the foothills up to 450 m (n=288 censuses of 18 transects; total length 24.1 km; elevational range 50–450 m). The Playa de Oro commune covers *c.* 10,900 ha, and is located about 30 km west of Alto Tambo. Most of the Playa de Oro area was covered by lightly logged mature and primary forest (EcoCiencia 1996, Sierra M. 1996, Jahn *et al.* 1999), and is part of the last large tract of continuous forest in the lowlands and foothills of Esmeraldas, Ecuador, encompassing some

300,000–400,000 ha (Jaramillo *et al.* 1996). Based on data from adjacent regions (Cañadas Cruz 1983, Lanfer 1995), we estimate that mean annual rainfall varies from about 3,000 mm in the western part of the commune area to well over 4,000 mm in the foothill zone. We assume that the climatic conditions are similar in the vicinity of Alto Tambo as well as in the Tsejpi commune, which borders the southwestern limits of the Playa de Oro commune. However, the climate seems drier near San Miguel (00°44′N, 78°55′W; 60 m), located on the Río Cayapas only *c.* 18 km south of Playa de Oro, as indicated by some distinct changes in the composition of the bird communities between the two sites.

Vocalizations

The song of the male is a series of 10 to 13 (up to 17) deep, hollow, froglike *oohp* or *oohw* notes. The notes are given at constant intervals of approximately 1.6 per second, and at a constant pitch of 340 to 600 Hz (Fig. 1a). Natural intervals between song bouts are often long (*c.* 15–30 s or more; mean=26 s, n=15), but tend to be shorter after playback. The song is not very loud, but due to the low frequency it is audible at a distance of up to *c.* 150 m.

The lower frequency song of the male was heard most often, but sometimes the female answered with a higher version of the *oohp* or *oohw* notes, which can change to bisyllabic *ooh-op* or *ooh-ow* notes within a series of calls. This version of the song is somewhat reminiscent of the song of the Gilded Barbet *C. auratus* (previously treated as a subspecies of the Black-spotted Barbet *C. niger*; Haffer 1997) of the Amazon basin, which consists of bisyllabic *oo-doot* notes (Hilty & Brown 1986).

In contrast, the song of the Orange-fronted Barbet *C. squamatus* is a drawn-out, low-volume and low frequency *rrrrrrrrrrrrrrrrrrrr*, emitted at about 300 to 700 Hz (Fig. 1b). The analyzed song phrase consists of about 125 notes and lasts about 5 s (25 notes per s). This vocalization is audible only at a distance of *c.* 50 m, hence it is easily missed. It is reminiscent of the song of a small toad (*Bufo*). *Capito squamatus* also often utters irregular series of froglike, dry, guttural *aark-aark-aark-aarr*,or *aark-a aarr-a-a* notes, with *c.* 1.8 notes per second at 1.0–2.7 kHz (Fig. 2b). The similar guttural croaking *aarrr-aarrr-aarrr-aar-aarrr* calls of *C. quinticolor* are less harsh, slightly lower in pitch (only 0.4–2.0 kHz), and the single notes are longer (up to 610 ms versus 300 ms), resulting in *quinticolor* emitting only about 1.3 notes per second (Fig. 2a).

Habitat and general biology

Our observations indicate that *C. quinticolor* and *C. squamatus* mostly segregate by habitat, with the former preferring mature secondary and primary forest, and the latter forest edge, younger secondary forest, and even mixed-culture plantations. During ten months of extensive surveys of mixed-culture plantations in the Playa de Oro and San Miguel regions by Mena V., *C. quinticolor* was not recorded, but *C. squamatus* was recorded during 22% of the censuses (n=108; present in all but one of 12 plantations). In the plantations, *C. squamatus* was observed singly or in small

groups of up to five individuals. The fruits of *Castilla elastica* (Moraceae) and of various *Cecropia* species (Moraceae) were identified as important food resources. Further, Mena V. probably found the first ever reported nest of *C. squamatus*. During the morning and afternoon censuses on 15 June 1996, he observed a female of this species entering and leaving a tree cavity 4 m up in a dead stub inside a plantation in the vicinity of San Miguel. In the morning, he also noted a male perching in a nearby tree. This suggests that *C. squamatus* uses mixed-culture plantations for foraging, roosting, and perhaps breeding. Nevertheless, both species do occur syntopically as shown by the following observations at two separate transects in the foothill region (at *c.* 200 m). In May 1997 Jahn tape-recorded the calls of *C. squamatus* inside closed-canopy forest and four months later the song of *C. quinticolor* was heard in the same area. On 3 August 1997 a pair of *C. squamatus* was observed on a forested

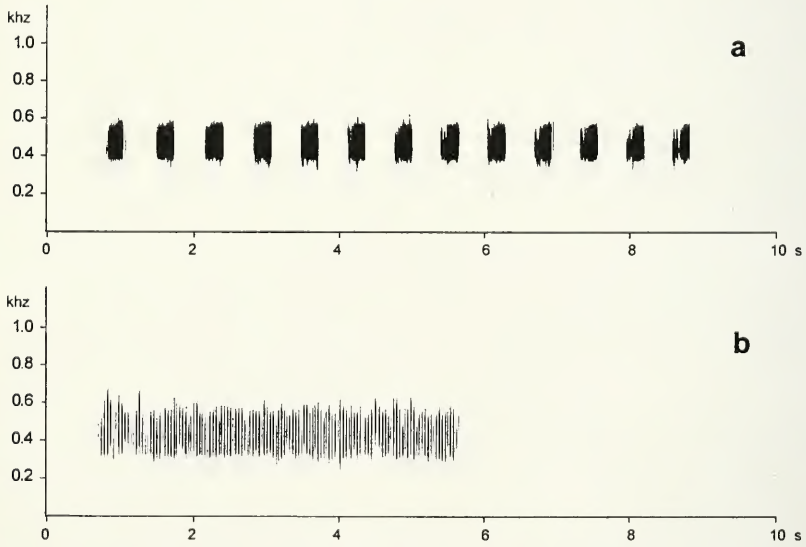

Figure 1. (a) *Capito quinticolor*, male, complete sequence of *oohp* or *oohw* notes of the song. Recorded near Playa de Oro, Esmeraldas, Ecuador, at *c.* 320 m on 7 May 1997 by O. Jahn. (b) *C. squamatus*, male, one complete *rrrrrrrrrrrrrrrrrrrr* song phrase. Recorded in the vicinity of Playa de Oro, at 60 m on 26 September 1996 by O. Jahn. We used Canary 1.2.4 (Bioacoustics Research Program, Cornell Laboratory of Ornithology, 1998) to produce the spectrograms.

ridge, accompanying a mixed-species canopy flock. During a census of the same transect on 7 August 1997 a pair of *C. quinticolor* sang only a few hundred metres from this location.

During Jahn's mist-netting study at Playa de Oro (n=2 transects; lengths 625 m and 550 m; study effort 30,051 net-metre-hours (NMH) and 30,634 NMH, respectively) a total of four individuals of *C. squamatus* were trapped in secondary

scrub inside an overgrown clearing and at a forest border. Two males were captured on 2 March 1996. Their moult data were: a) first male, beginning moult of remiges and rectrices; b) second male, no moult of remiges, rectrices fresh. A third male was captured on 7 November 1996; moult of remiges in the final stage, rectrices showed beginnings of moult. Two days later a female was mist-netted, showing no clear signs of moult. Mass: males, 57.5–59 g; female, 58 g. Soft part colours for all: iris brown; bill grey with black tip; tarsus grey.

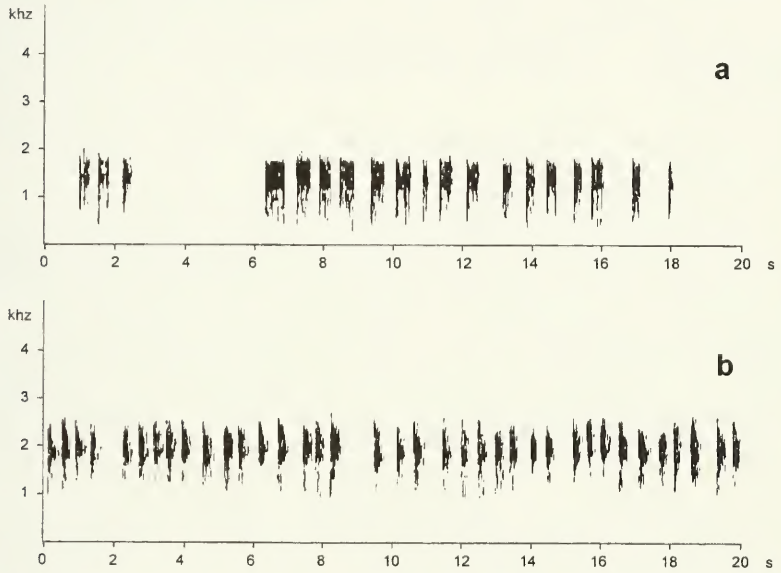

Figure 2. (a) *Capito quinticolor*, male, part of a sequence of excited croaking aarrr-aarrr-aarrr-aar-aarr . . . calls. Recorded on the Pueblo Nuevo trail, off the Junín-Tumaco highway Nariño, Colombia, at *c.* 500 m in August 1998 by P. Coopmans. (b) *C. squamatus*, sex unknown, part of a sequence of excited croaking *aark-aark-aark-aarr* . . . calls. Recorded in the vicinity of Salto del Bravo, Río Bravo, Esmeraldas, Ecuador, at *c.* 150 m on 14 November 1999 by O. Jahn.

Range and conservation

Our records not only extend the range of *C. quinticolor* southward into Ecuador but also its elevational limits. Presumably it occurs somewhat higher into Ecuador than our records indicate since P. Salaman (pers. comm.) and Coopmans have recorded *C. quinticolor* up to 575 m on the Pueblo Nuevo trail (01°26′N, 78°15′W), Nariño, Colombia, and we assume that the species is found up to at least 600 m. Nevertheless, it has not been recorded at El Placer, Esmeraldas, an extensively surveyed site at 650 m, located just a few km to the south of Alto Tambo (Robbins, Coopmans, Ridgely unpubl. data).

There is a strong precipitation gradient in the province of Esmeraldas, with annual rainfall increasing from less than 1,000 mm in the coastal areas near the town of Esmeraldas to over 4,000 mm in the foothills of the Andes (Lanfer 1995). Because *C. quiuticolor* seems to be restricted to wet lowland and foothill forest up to *c.* 600 m, the region with suitable ecological conditions in northwestern Ecuador is probably limited to a narrow belt only *c.*20–50 km wide and *c.* 110–170 km long, i.e. *c.* 2,200–8,500 km^2 (estimated from climate maps in Lanfer 1995). This presumed distribution extends south from the Colombian border east of Mataje to the Rio Guayllabamba drainage, which forms the southern border of Esmeraldas. Just to the south the number of humid months (according to Lauer (1952); based on monthly precipitation/temperature ratio) at the appropriate elevational range drops from 11 to 7 per year (Lanfer 1995).

Nonetheless, the confirmed Ecuadorian range of *C. quiuticolor* is much smaller, encompassing an area of only *c.* 20 km wide and 60 km long (1,200 km^2). Despite intensive field work by Jahn & Mena V. in this region (from August 1995 to November 1999, they studied 12 different sites in the Río Santiago, Río Cayapas, and Río Onzole areas; n=412 censuses of 41 transects; total length 50.6 km; elevational range 30–450 m), *C. quiuticolor* has not been found south of the Tsejpi commune, Río Zapallo, or west of the Río Cayapas. Hence, the estimated range presented above may be too optimistic, perhaps due to some inaccuracies in climate maps (Lanfer 1995).

The Five-coloured Barbet's confirmed distributional range in Ecuador has undergone severe deforestation in recent decades (Dodson & Gentry 1991, Sierra M. 1996, pers. obs.), catalyzed in the last few years by the construction of two new roads. The first road connects Ibarra, Imbabura, a town in the inter-Andean valley, with San Lorenzo, Esmeraldas on the Pacific coast. The second connects the town of Esmeraldas with Mataje on the Colombian border and continues into Colombia. As a direct consequence of these road projects the "Unidad Coordinadora para el Desarrollo Forestal Sustentable en Esmeraldas" (UCE), an NGO which stimulates and coordinates the sustainable use of the timber resources in the region, predicts a severe loss of forest in northern Esmeraldas within the next 10 years, unless management plans for sustainable forestry are fully implemented (Jaramillo *et al.* 1996).

Presently only two protected areas in Ecuador contain potential habitat for *C. quiuticolor*:

The reserve "Cotacachi-Cayapas", 204,420 ha (IUCN 1992), in Esmeraldas and Imbabura, ranges from *c.* 100 m to over 4,500 m (Fundación Natura 1992) and is located in the zone where annual precipitation exceeds 3,000 mm (Lanfer 1995). However, only a few thousand hectares of this reserve are located below 600 m. Mena V. and Jahn did not record *C. quiuticolor* in November 1999, during rapid assessment surveys at Charco Vicente (00°41´N, 78°53´W), Río San Miguel, and at Salto del Bravo (00°40´N, 78°57´W), Río Bravo. These two sites represent the lowest elevational range, *c.* 100–350 m, within the Cotacachi-Cayapas reserve.

The "Awá Ethnographic Reserve", 101,000 ha (Esmeraldas, Carchi, Imbabura) abuts the Colombian border in the Río Mira drainage (Wege & Long 1995). About

28,000 ha of its total area lie in Esmeraldas (Jaramillo *et al.* 1996). This section is located below 600 m, probably in the zone with an annual precipitation above 3,000 mm (Lanfer 1995). An additional few thousand hectares of suitable habitat are located in Carchi. Little ornithological work has been carried out within the Awá reserve (Wege & Long 1995) and future investigations should strive to clarify the status of *C. quinticolor* there.

In summary, only a few hundred square kilometres of the potential range of *C. quinticolor* and other foothill endemics in Ecuador are located within legally protected areas of the country, and even the conservation status of these protected areas is not secure (Jahn & Mena V., pers. obs.). The situation seems to be more hopeful in the Colombian part of its range, where this Chocó endemic has been recorded at a number of recently surveyed sites, and where about 60% of the Pacific lowland and foothill forest remains intact and largely unthreatened in the immediate future (P. Salaman, pers. comm.).

Acknowledgements

Jahn's study from 1995 through 1998 was part of the 'Flanking Program for Tropical Ecology' (TÖB; project no. 90.2136.1-03.100) of the Deutsche Gesellschaft für Technische Zusammenarbeit, GTZ, Germany. The study was carried out in cooperation with the Fundación para el Estudio e Investigación de los Colibríes Ecuatorianos (FEICE), Quito, as a national partner, with the Fundación Ecuatoriana de Estudios Ecológicos (EcoCiencia), Quito, as a logistical partner, and with the logistic help, for which we are most grateful, of the SUBIR Project, CARE/Ecuador, and the Deutscher Entwicklungsdienst, DED, Germany. Jahn's study would have been impossible without the additional financial support of the Brehm-Funds for International Bird Conservation, Germany. The Studies of Mena V. (1995 onwards) and Jahn (since April 1998) were carried out for EcoCiencia with the generous financial support of the SUBIR Project, CARE/Ecuador, and The John D. and Catherine T. MacArthur Foundation. We would like to thank the Instituto Ecuatoriano Forestal de Areas Naturales y Vida Silvestre (INEFAN), Quito, for permission to work in Ecuador and the communities of Playa de Oro, San Miguel, Tsejpi, Guadual, Machua, Chispero, Calle Manza, Gualpi de Onzole and Colón de Onzole for permission to work on their lands. We thank Jody Stallings (coordinator of the SUBIR Project) and Rocío Alarcón (president of EcoCiencia) for their constant support of our work; Paul Salaman for exchanges of information and comments on the manuscript; David L. Pearson for comments on an early draft of the manuscript, and Paul Van Gasse for reviewing the final draft.

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The races of the Isabelline Shrike *Lanius isabellinus* and their nomenclature

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Received 13 July 1998

The Isabelline (or Red-tailed) Shrike *Lanius isabellinus** is usually regarded as comprising four races. Two of these breed in central Asia and migrate southwestwards to winter in Arabia and NE Africa. The other two breed in N China and make shorter migrations to winter from Pakistan and NW India to Iran.

*Often treated in the past as conspecific with the Red-backed Shrike *L. collurio* (e.g. Vaurie 1959) or with both Red-backed Shrike and Brown Shrike *L. cristatus* (e.g. Dement'ev & Gladkov 1954, Voous 1960), but regarded here as a separate species, following recent authors such as Panov (1983, 1996), Cramp & Perrins (1993) and Glutz von Blotsheim & Bauer (1993).